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Students with Visual Impairments in Texas: Description and Extrapolation of Data

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Abstract: This study found that between 2000 and 2002, the percentage of students with visual impairments in the general student population of Texas was close to a previously quoted figure of 0.15%. In addition, the percentage of students with visual impairments who were identified as totally blind was found to be 4%–5% higher than the previous estimate of 20%. There was some indication that the prevalence or reporting of visual impairment in school-age children was different across different ethnic groups.

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Using data from the 1990 census, Nelson and Dimitrova (1993) reported that 0.15% of the general population from birth to age 17 were visually impaired. For children from birth to age 6, their definition of severe visual impairment was based on caregivers' reports that the children lacked useful vision, and for those aged 7–17, it was based on the "inability to see or read ordinary newspaper print even when wearing glasses or contact lenses" (p. 80). This figure was also used in the National Plan for Training Personnel for the Education of Students with Visual Impairments (Mason, Davidson, & McNerney, 2000). This statistic on the prevalence of visual impairments in the general population is 14 years old, and annother often-cited statistic that 20% of the legally blind population is totally blind is 31 years old (Kahn & Moorhead, 1973).

Although these statistics have often been cited in the literature (for example, Kirchner & Schmeidler, 1997), they have not been validated by more recent data. It is important to check such rates of prevalence periodically and, for educational purposes, to distinguish differences in prevalence for children and adults. Toward this end, we analyzed a robust data set on students with visual disabilities in Texas. We believed that the large number of students with visual impairments in this state would allow the findings to be extrapolated to other states.

The primary impetus for this analysis was to determine whether the statistics just cited hold true for the current

preschool and school-age populations of students with visual impairments. In addition, we wanted to describe these populations more fully than has previously been reported in the literature. Having access to such data as ethnicity, class placement, and reading scores allowed us to investigate connections among variables. This description, based on more-recent data, could be used to assess states' need to provide more or different alternate learning media and to explore such questions as whether students are under- or overrepresented on a variety of variables, such as ethnicity and school placement. Furthermore, these analyses may provide other states with a standard by which to evaluate their own data.

Methodology

Two data sets, taken from the Texas Education Agency's Annual Registration of Students with Visual Impairments for 2000–01 and 2001–02, contained information on students with visual impairments who attended both public schools and the Texas School for the Blind and Visually Impaired (TSBVI). These data sets were modified to include only students who were enrolled in preschool through grade 12; those who were older than 22 were omitted from the analysis. We restricted the data set to compare the data on achievement related to grade level with the data on achievement for the general school population. Additional data on the prevalence of variables in the general school population in Texas (for example,

ethnicity) were obtained from reports of the state's Academic Excellence Indicator System for the relevant years (2000–01 and 2001–02).

In Texas, students are categorized as being in graded classes or as "other registrants" (OR). A student who is identified as being in the OR category is

> usually of school age, has a severe disability, and is involved in an ungraded, nonacademic program (for example, functional life skills). Also...students who are in an academic program but are functioning at three or more years behind their peers, and using textbooks that are three or more years below their grade level classification. (Texas Education Agency, 2003, p. 6).

Students who were in the OR group were separated out for analyses involving reading level. Data for these students, however, were included in the analyses of the full population for such variables as visual acuity, school attended, reading media, and ethnicity.

Results

In this section, we describe the variables that we analyzed separately for each of the two years of data. Although comparisons can be made from one year to the other, no trend should be implied. Throughout this section, the academic year 2000–01 is referred to as Year 1, and the academic year 2001–02 is referred to as Year 2.

Prevalence of blindness

The data were analyzed to determine the percentage of school-age children with visual impairments in the general population of school-age children in Texas and how the students with visual impairments were distributed across categories of visual acuity. In the data set, 6,536 students in Year 1 and 6,950 students in Year 2 were identified as having visual impairments. These figures represented 0.16% of the general school-age population in Year 1 and 0.17% in Year 2.

Legal blindness is often considered for purposes of determining eligibility (for example, for the use of quota funds through the American Printing House for the Blind). The data sets we used contained indications of both visual acuity and whether a student qualified as "legally blind." Legal blindness is defined as

> central visual acuity of 20/200 or less in the better eye with corrective glasses or central visual acuity of more than 20/200 if there is a visual field defect in which the peripheral field is contracted to such an extent that the widest diameter of the visual field subtends an angular distance no greater than 20 degrees in the better eye (Koestler, 1976, p. 45).

The Year 1 data set revealed that 4,394 students were identified as legally blind— 67.2% of the children who were identified as visually impaired in Texas. In Year 2, 4,673 students (67.2% of those who were identified as visually impaired) were identified as legally blind.

Raw data on students' acuities varied widely in degree

and in the manner in which acuities were reported. To organize the reported visual acuities into a systematic format, we categorized them using the acuity ranges adopted by the International Council of Ophthalmology (ICO) (Colenbrander, 2002) as shown in Box 1. Table 1 presents the percentages of students with visual impairments who fell in each ICO category for each year.

For students in graded classes, acuities and/or designations of total blindness were available for 65.4% of the students in Year 1 and 64.6% in Year 2; for students with the OR classification, acuities and/or designations of total blindness were available for 54.5% in Year 1 and 52.4% in Year 2. Using the ICO category of "blind" to represent the percentage of the population of students with visual impairments (both the graded and OR groups) who would be considered "totally blind," we found that 24.9% of the students with visual impairments were categorized as totally blind in Year 1 and 24.0% in Year 2.

School placement

Most of the visually impaired students in Texas, including infants, were enrolled in public schools or public programs: 98.2% (*n* = 6,392) in Year 1 and 98.0% (*n* = 6,777) in Year 2. The full-time enrollments of students (from those with severe low vision to those with total blindness) in the TSBVI were 115 in Year 1 and 138 in Year 2. It should be noted

that the TSBVI enrollment averages about 150 students. Year 1 of this study was unusual in its enrollment because it followed a year in which many students graduated or made a transition to their local school programs (P. Hatlen, personal communication, September 16, 2003).

Although enrollments of the general population of Texas schoolchildren do not vary appreciably from kindergarten through grade 10, students with visual impairments had higher enrollment rates for kindergarten and grade 1. Table 2 shows the grade enrollments for students with visual impairments and for all Texas schoolchildren for the two years that were analyzed. The data on grade enrollment include only students for whom a grade was identified in the data sets. Students from birth to prekindergarten ages (1,295 in Year 1 and 1,391 in Year 2) and students in the OR group (2,526 in Year 1 and 2,734 in Year 2) were not included in these data. In grades 2–12, the distribution of students' enrollment in graded classes was similar for both data sets.

Ethnicity and additional disabilities

Table 3 shows, for the two years that were analyzed, the ethnic breakdown of students who were identified as visually impaired and of all schoolchildren in Texas. Both the African American and the Anglo groups had slightly higher than expected numbers of visually impaired students, whereas the Hispanic group had a

slightly lower than expected number of visually impaired students.

We examined the breakdown of ethnicity by acuity category to determine whether Texas had an equal representation of visual impairments across ethnic categories. We found a significant relationship between visual acuity category and ethnicity for both Year 1 ($x^2(20) = 99.74$) and Year 2 ($x^2(20) = 111.39$). Since the relative lack of students in the Native American and Asian categories may have contributed to the significance of the findings, we ran the analysis a second time using only the three most well-represented ethnic groups (Anglo, Hispanic, and African American). Once again, we found a significant relationship between visual acuity category and ethnicity for both Year 1 ($x^2(10) = 75.04$) and Year 2 ($x^2(10) = 97.62$).

With regard to the pattern of representation of students across acuity categories for the three most-well-represented ethnic groups (see Table 4), most of the students in each ethnic group had severe low vision (with the slight exception of the Anglo group in Year 2). The African American group had twice as many students in the severe low vision category as in any other category. However, the Hispanic group had almost as many in the blind category as in the severe low vision category, and the Anglo group had approximately an equal number in the normal–near normal category as in the severe low vision category.

The profound and near-blind categories were the least well represented for each ethnic group. These patterns may indicate different patterns of prevalence for the different ethnic groups or different patterns of reporting of visual impairments for the different groups. They may also reflect a tendency, when classifying students' acuities, to slot students into typical rankings that are found on Snellen charts. For example, fewer children would be expected in the near-blind category simply because it is not likely that a child would have a measured acuity of between 20/1126 and 20/2000.

A slight majority of the visually impaired students (in both the graded and the OR groups) reported visual impairment as their primary condition—58.1% in Year 1 and 58.0% in Year 2. However, almost two-thirds had at least one additional disability—65.3% in Year 1 and 65.4% in Year 2.

Reading media

An important characteristic of students with visual impairments is the type of medium they use to gain access to information. Table 5 shows the distribution of students with visual impairments by various reading media—both those who used each type of reading medium and those who used a single reading medium. As can be seen in the table, although about 25% of the students with visual impairments were identified as being "blind," only about 7% of the students in graded

classrooms were using braille. When prereaders and nonreaders were removed from the analysis, we found that the OR students were twice as likely as the students in graded classrooms to use braille as their sole reading medium. For both groups, large print and standard print were the most common reading media.

Among the students in graded classes who used multiple media, the most common combination of media was large print and standard print (16.2% in Year 1 and 17.6% in Year 2), followed by large print, standard print, and auditory media (5.3% in Year 1 and 6.3% in Year 2) and braille and auditory media (4.3% in Year 1 and 4.0% in Year 2). For students in the OR group, the most common combination of reading media was large print and standard print (9.8% in Year 1 and 10.4% in Year 2).

When the acuity category was compared to the reading medium, we found, as expected, that the number of braille readers increased as the severity of the visual impairments increased: from 1 in the normal/near-normal category to 157 in the blind category in Year 1. The reverse relationship was demonstrated with readers of large print except that there was an abundance of large-print readers (463) in the severe low vision category (which includes the cutoff point for legal blindness). There were equal numbers of regular-print readers in the severe low vision (440) and normal/near-normal (438) categories, with approximately half as many in the moderate low vision

category (259).

Textbook reading levels

Although reading scores were not available for each student, data were available on the level of the textbooks that the students used in the classroom. Table 6 shows the textbook reading levels, in comparison to grade level, for readers of braille, large print, and regular print, respectively. Data in this section refer to textbook reading levels for students in graded classes and for students in the OR classification for whom reading levels were available. The results indicate that about 70% of the braille readers were reading at grade level, compared to slightly more than 80% of the readers of large print or regular print. Few students in any category were reading above grade level. The bulk of the students who read at three or more years below their sighted classmates were in the OR group.

Orientation and Mobility Services

Of the students in graded classes and the OR group, 1,647 (25.3%) in Year 1 and 1,822 (26.3%) in Year 2 were receiving orientation and mobility (O&M) services. In Year 1, for the 4,011 students for whom an acuity category could be assigned, the two acuity categories that had the most students who received O&M services were the groups who were blind (*n* = 467) and had severe low vision (*n* = 352). In Year 2,

for the 4,169 students for whom an acuity category could be assigned, the same two groups contained the most students who received O&M services (n = 496 of those who were blind and n = 381 of those with severe low vision). The profound low vision and near-blind groups had far fewer students who received O&M services. The distribution of O&M services across acuity categories was significantly different in Year 1 ($x^2(5) = 514.13$) and Year 2 ($x^2(5) = 534.63$). The distribution of students in the OR classification mirrored the distribution of O&M services across visual acuity categories. These results may reflect a tendency to offer whatever O&M services are available to students who are totally blind in graded or OR classifications before such services are offered to other students (for example, those who have low vision) in both the graded OR groups whose vision does not initially appear to affect their ability to travel around their schools. It was not known how many of the students who did not receive O&M services would benefit from them.

Discussion

This study began with the questions of whether the often-cited proportions of the number of people in the general population with visual impairments and the number of functionally or totally blind people among those with visual impairments are still accurate and applicable to children. Our findings show that in both years of data analyzed, the percentages of students in

the general student population who were identified as being visually impaired were relatively close to the 0.15% figure quoted by Nelson and Dimitrova (1993) (0.16% in Year 1 and 0.17% in Year 2). However, the percentage of visually impaired students who were identified as "blind" was slightly higher than the 20% figure cited by Kahn and Moorhead (1973) (24.9% in Year 1 and 24.0% in Year 2). This is a conservative estimate, given that acuity measures were available for little more than half the students in the data sets. It is possible that precise measurements were not noted for students with multiple disabilities who had severe visual impairments. The proportion of children who were identified with visual and additional disabilities (65%) is similar to previous findings of children in local schools in Texas (61%) (Corn & Coatney, 1984).

Although Texas collects a substantial amount of information related to the identification of children with visual impairments, their characteristics, and elements of the services they receive, these percentages may underestimate the true number of visually impaired children in the general population. The slightly higher than expected percentages found in these data were calculated using only the category of "blind," as stipulated by the ICO (Colenbrander, 2002). If a portion of the children whose acuities fell within the categories of "profound low vision" and "near blind" were included to reflect students who would be included in the educational label of "functionally blind," the proportions would be even higher.

In comparing the distribution of ethnic groups among Texas schoolchildren to that in the data on children with visual impairments, we found a higher than expected percentage of Caucasian and African American children and a lower-than-expected percentage of Hispanic children who were identified as visually impaired. This may be a true representation of the distribution of visual impairments within ethnic groups or may reflect language barriers, concerns about labeling children, or an insufficient effort within the Hispanic community or among health care professionals and educators to address the visual and educational needs of Hispanic children.

The distribution of students with visual impairments across grades in these data tended to be relatively similar to that of all students in Texas. One exception was the higher percentage of visually impaired students in kindergarten and grade 1, which may indicate that the early identification program in Texas is effective. The decrease in the percentages from grade 2 on may be due to students obtaining corrections for their vision, moving to the TSBVI for their education, being reclassified as having some other handicapping condition, moving out of the state, or otherwise being removed from the educational system. It may also reflect students who will eventually be placed in the OR group after grade 1 but are in regular classrooms until they are properly identified and assessed. If this is true, it may indicate that preschool assessments of

students with visual impairments are not useful for determining academic placement.

Readers may be surprised by the low full-time enrollment of children at the TSBVI in comparison to children who are enrolled in residential schools in other states. This low enrollment may be indicative of the state's emphasis on providing educational services at the local level when a free and appropriate public education can be achieved and of TSBVI's focus on providing extensive outreach services and short-term placements at the school.

This study found that children with visual impairments who attend graded classes were generally using textbooks at their grade levels. Several important limitations need to be noted in this regard. The data did not indicate whether the students comprehended the textbooks they were using, whether the reported reading media were the students' primary or secondary media, or whether the students were using dual media. In addition, the data did not provide information about the students' reading comprehension or reading speeds or the amount of time they could read before they felt visual fatigue. Furthermore, the number of students who were reading standard-print textbooks with and without optical devices was unknown. The fact that only half these children who were identified as totally blind were braille readers may be explained by the fact that over half the children were identified as having multiple impairments.

The general findings on the prevalence of children with visual impairments indicate that a change may be in order in how the prevalence of total blindness is viewed. Although previously cited figures of the proportion of people with visual impairments seem to hold true for the population of school-age children, the percentage of visually impaired children who are blind may be higher than one would expect. There is also the question of whether the prevalence of visual impairment is different for different ethnic groups. It is important to continue to use large data sets to verify what figures the field of visual impairment cites when describing a population. Beyond population statistics, it is important to use data to describe the population of children with visual impairments in more detail. By linking data on prevalence to such information as visual acuity levels, achievement, use of reading media, and educational placement, educators will be better able to plan and provide appropriate special education services.

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